Aaron Hathaway
September 28, 2017

Rule 26 (a)(2) Report
Agronomic Losses from Ongoing Rover Pipeline Installation at Meadowbrook Sod Farm

Qualifications for Opinions

I, Aaron Hathaway, have been working in turfgrass research for 18 years at Michigan State University. I completed an M.S. in Crop and Soil Sciences in 2005 and began working as a research assistant in the same year, which has continued to the present time. My training and area of expertise through research in the last 15 years has focused on turfgrass systems. I have spent the past 10 years teaching turfgrass related classes to students at MSU, as well as seminars to groups like the Golf Course Superintendents Association of America, Michigan Nursery and Landscape Association, Michigan Sod Growers Association, and Michigan Green Industry Association. The opinions herein are based on my years of education specific to turfgrass plant and soil sciences, on years of cooperation with turfgrass growers and managers, on years of teaching students, and years of research conducted at the Hancock Turfgrass Research Center on the campus of MSU.

Materials Reviewed

1. Verified Complaint for Condemnation by Plaintiff, Rover Pipeline LLC; Case No.: 2:17-CV-10365
2. Verified Answer to Verified Complaint by Defendant, Simchecks
3. Initial Disclosures by Plaintiff, Rover Pipeline LLC
4. Initial Disclosures by Defendant, Simchecks

Observance at Meadowbrook Sod Farm

1. June 20, 2017: this first visit to Meadowbrook Sod Farm took place before any of the pipeline equipment was in place, but after some of the visible preliminary work had been done, such as tree removal. The area scheduled to be affected by the pipeline was a healthy and mature stand of Kentucky bluegrass at this point in time.
2. July 30, 2017: machinery was in place, a large metal bridge over a ditch was in place, and large timber pathways had been built. Machinery onsite at this time were large CAT 336F excavators. See Photo 1.
3. September 2, 2017: more timber pathways were in place leading many pipes, which were also placed along the site. Many orange barriers were also in place at this time around the pathways and the pipes. See Photo 2.
4. September 16, 2017: pipes were still in place on the turfgrass surface.

Preliminary Opinions

The opinions herein are based on what I have witnessed onsite so far and on my understanding that the pipe is eventually going to be placed underground, which would require removal of soil and replacement of, at least, some of that same soil. Because the project is ongoing, my opinions are preliminary in nature. I will supplement this report as more information becomes available and as more work is completed.

The affected turfgrass sod, observed on July 30, September 2, and September 16, 2017, will most likely be destroyed, un-harvestable and unsalable in the areas excavated for pipeline installation, in areas where timbers are placed for large machinery travel, and in timber-less areas where large machinery travels. Any sod that has been covered with the timber pathways will most likely be dead when they are removed. Any removal of soil will also remove the sod crop, any placement of soil on the turfgrass surface will most likely kill the sod or smother it enough to make it unsalable, and any areas run over with large machinery will most likely be killed, injured, or compacted enough to make it un-harvestable and/or unsalable.

Furthermore, there are other potential problems that soil removal and large machinery will likely cause, some of which will likely be prolonged:

1. Over time, many years, soil aggregates, producing macropore space, which allows water to move through the soil profile more quickly, improves air exchange in soil and allows turfgrass roots to develop deeper into a soil profile. The soil structure that has been gained over time through wetting/drying, freezing/thawing, and even through chemical processes in the soil will be affected by the building of the pipeline onsite and by the installation of the pipeline into the soil. The traffic from heavy machinery and from workers necessary to construct the pipeline and install the pipeline, especially when the soil is wet, will compact the soil closer to the surface and negate or reduce some of the benefits of a more-structured soil. Further, removal and replacement of soil when the pipeline is installed will destroy soil structure deeper in the soil. The destruction of soil structure will most likely lead to reduced speed of water drainage through the soil profile, increased water runoff from the surface, and decreased turfgrass rooting, which would likely lead to underdeveloped plants and a loss of harvestable sod. Sod is held together by a knitting of turfgrass roots and rhizomes (in the case of Kentucky bluegrass which is grown at Meadowbrook Sod Farm) – compacted soils cause relatively weak turfgrass rooting and would most likely decrease the knitting ability of a sod crop. Alleviation of soil compaction at the surface (0-8 inches) can be attained with core cultivating (aerating) machines, which can be used after turfgrass establishment, but will cost money to purchase/rent and to run. This practice (core cultivation) may need to be repeated two or three times in a growing season and, perhaps, into the subsequent seasons. Core cultivation will likely further

weaken the knitting of the turfgrass roots and rhizomes and would likely lead to a sod crop that does not hold together, so specific timing of this practice is important so it does not interfere with the harvest, which is yet another concern. The deeper soil aggregation, which occurred over many years and allows faster movement of water, air, and nutrients through the entire soil profile, will only reoccur over many more years.

2. Soil disruption will bring up weed seed that would otherwise not be a problem. These seeds can germinate and infiltrate the sod, which would have to be controlled by spraying herbicides or the crop could be unsalable. Annual bluegrass is the weed seed of highest concern because it is very difficult to selectively remove from a sod crop, often requiring many years of herbicide applications to reach acceptable levels for the sale of a sod crop. Annual bluegrass happens to be more problematic in compacted soils and in weakened turf stands. New weeds infiltrating the area in question would most likely be spread to other areas in the sod field as well because mowing, water and wind spread seeds and/or vegetative parts.

3. Mr. Simcheck indicated during conversation that drain tiles are in the sod field in question. Drain tiles damaged by the removal of soil would affect the overall drainage of the field. Drain tiles often run entire lengths of crop fields to move water to a specific place, which means destruction of any portion of a drain tile would affect the effectiveness of the other portions of drain tile in the same line. This drain tile would require repair and that repair would most likely affect other areas of the sod during the process.

4. The process of the pipeline installation could also inhibit the harvesting of certain portions of the field or at least delay sod harvest and removal from the field, which could add to profit losses. This is not an agronomic issue, but a logistical issue. There are many other logistical issues that could also arise as a result of the work being done to finish the pipeline build and installation.

Alleviation of soil compaction is a difficult task on turf stands because alleviation methods, such as core cultivation, disrupt the crop cover. In sod, disruption of the crop would most likely lengthen the time necessary for the crop to recover before harvest is possible. The disruption of the soil, which actually involves removal of soil, also brings more weed seed to the surface and increases weed seed germination in the disrupted areas. In very compacted soils, multiple core cultivation timings are most likely necessary to continually provide increased oxygen and pore space in the soil because each core cultivation event only affects 2-6% of the surface. Although core cultivation can help to alleviate some soil compaction at the surface and increase gas exchange and water movement, but the natural soil aggregation that takes place over each consecutive year of freeze/thaw periods and wetting/drying cycles will require many years to return to a similar soil structure attained before the soil was disturbed and packed back around the pipeline.

It is unknown to me exactly what process Rover will utilize to replace the soil around the pipeline. If the topsoil is placed back around the pipeline first and the subsoil is placed at the surface, the soil problem would be further compounded. Subsoil lacks the organic matter content built up over time in topsoil and, therefore, holds less water and nutrients, making both less available to plants. This possible scenario would make the growth of sod in the affected areas even more difficult.

All of the work that is being done on the Meadowbrook Sod Farm will cause the farm a loss of the current sod crop in the affected area and will most likely cause the farm a burden of time and money to restore the affected area to its original quality for future sod crops with salable quality.

Photographs:

Photo 1: Timber Pathway and Machinery on July 30, 2017

Photo 2: Timber Pathway and Pipeline Route

Exhibits

1. Rule 26 (a)(2) Report; Agronomic Losses from Ongoing Rover Pipeline Installation at Meadowbrook Sod Farm
2. Curriculum Vitae for Aaron Hathaway
3. Photographs of Meadowbrook Sod Farm and Rover setup and operations.

Supplemental Opinions

Because this project is ongoing, there are many unknowns that may or may not affect Meadowbrook Sod Farm. I expect to review additional materials as they become available including reports of the plaintiffs depositions of parties and additional materials as they become known and as the scope of the means necessary to recover the original agronomic conditions and costs to do so becomes more apparent. I may want to take measurements of the affected and unaffected portions on site to compare soil bulk density, surface hardness, weed emergence and establishment, and soil water infiltration.

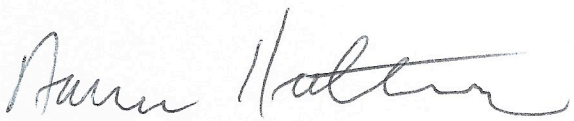
Previous Cases

I have had no previous cases in federal court.

Bibliography

USDA Natural Resources Conservation Service. 2008. Soil Quality Indicators. Downloaded from http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053261.pdf

Vargas, J. M. Jr.; Turgeon, A. J. 2004. *Poa annua*: Physiology, Culture, and Control of Annual Bluegrass. Hoboken, New Jersey: John Wiley & Sons, Inc. ix, 1-70, [8], 71-165 pp.



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